

CLAIMS

1. An implantable heart-monitoring device comprising:
 - one or more leads for sensing electrical signals of a patient or for applying electrical energy to the patient;
 - a therapy circuit for delivering electrical energy through one or more of the leads to the patient; and
 - a monitoring circuit for monitoring heart activity of the patient through one or more of the leads, the monitoring circuit comprising:
 - means for calculating a set of two or more intervals based on the electrical signals of the patient;
 - means for determining a minimum interval based on the set of two or more intervals;
 - means for calculating a range statistic based on a difference between a first subset and second subset of the intervals;
 - means for calculating a dispersion index based on a subset of the intervals;
 - means for calculating a number based on the minimum interval, the range statistic, the dispersion index; and
 - means for comparing the number to a threshold to determine a therapy option.
2. The device of claim 1, wherein the first subset of the intervals includes only a first one of the intervals and the second subset of the intervals includes only a second one of the intervals.
3. The device of claim 1, wherein each of the set of two or more intervals is an atrial depolarization interval.
4. The device of claim 1, wherein the means for calculating a number based on

the minimum interval, the range statistic, and the dispersion index computes the number based on an function having one of the following forms:

$$IDA_1 = K * \text{Range} * \text{Dispersion_index} * (\text{Min_interval})^{-1}$$

$$IDA_2 = K_1 * \text{Range} + K_2 * \text{Dispersion_index} + K_3 * (\text{Min_interval})^{-1}$$

where K , K_1 , K_2 , and K_3 denote constants; Range denotes the range statistic; Dispersion_index denotes the dispersion index; and Min_interval denotes the minimum interval.

5. The device of claim 1, wherein K and K_1 are each approximately 1.0, and wherein K_1 and K_2 are each approximately 0.0001.
6. A medical device comprising:
 - means for calculating a set of two or more intervals based on electrical signals;
 - means for determining a minimum interval based on the set of two or more intervals;
 - means for calculating a range statistic based on a difference between a first subset and second subset of the intervals;
 - means for calculating a dispersion index based on a subset of the intervals;
 - means for calculating a number based on the minimum interval, the range statistic, the dispersion index; and
 - means for comparing the number to a threshold.
7. A medical device comprising:
 - means for calculating a set of two or more intervals based on electrical signals;
 - means for calculating first and second numbers, with each number indicative of dispersion of the set of two or more intervals;

means for calculating a number based on the first and second numbers; and
means for comparing the number to a threshold.

8. A method comprising:
calculating a set of two or more intervals based on electrical signals;
calculating first and second numbers, with each number indicative of
dispersion of the set of two or more intervals;
calculating a number based on the first and second numbers; and
comparing the number to a threshold.
9. A method of processing data representative of an electrogram, comprising:
calculating a set of two or more intervals based on at least a portion of the
data;
calculating a minimum interval based on the set of intervals;
calculating a range statistic based on a difference between a first subset and
second subset of the intervals;
calculating a dispersion index based on a subset of the intervals;
calculating a number based on the minimum interval, the range statistic, the
dispersion index; and
comparing the number to a threshold.
10. A method of representing an electrogram signal, comprising:
deriving at least three numbers based on intervals in the electrogram signal;
and
defining a point in a space based on the three numbers, with each number
corresponding to a dimension in the space.
11. The method of claim 10, wherein deriving at least three numbers based on

intervals in the electrogram signal, comprises:

- calculating a set of intervals based on the electrogram signal;
- calculating a minimum interval based on the set of two or more intervals to derive a first of the three numbers;
- calculating a range statistic based on a difference between a first subset and second subset of the intervals to derive a second of the three numbers;
- calculating a dispersion index based on a subset of the intervals to derive a third of the three numbers.

12. The method of claim 10, wherein deriving at least three numbers based on intervals in the electrogram signal, comprises:

- calculating a set of intervals based on the electrogram signal;
- calculating at least one of the three numbers based on a difference between a first subset and second subset of the intervals;
- calculating at least one of the three numbers based on standard deviation or variance of a subset of the intervals.

13. A method of identifying a therapy option in a medical device, comprising:

- defining a surface in a space having at least three dimensions;
- calculating a set of two or more intervals based on data representative of at least a portion of an electrogram;
- calculating a minimum interval based on the set of intervals;
- calculating a range statistic based on a difference between a first subset and second subset of the intervals;
- calculating a dispersion index based on a subset of the intervals;
- defining a point in the space based on the minimum interval, the range statistic, the dispersion index; and

determining relative position of the point and surface.

14. A method of identifying a therapy option in a medical device, comprising:
defining a surface in a space having at least three dimensions;
calculating a set of two or more intervals based on data representative of at
least a portion of an electrogram;
calculating a minimum interval based on the set of intervals;
calculating a range statistic based on a difference between a first subset and
second subset of the intervals;
calculating a dispersion index based on a subset of the intervals;
defining a point or region in the space based on the minimum interval, the
range statistic, the dispersion index; and
determining relative position of the point and surface.

15. A method of processing data representative of at least a portion of an
electrogram, comprising:
calculating a set of two or more intervals based on data representative of at
least a portion of an electrogram;
calculating at least first, second, and third numbers based on the set of
intervals; and
calculating a fourth number based on the first, second, and third numbers;
and
comparing the fourth number to a therapy threshold.

16. A machine-executable medium comprising one or more instructions for
processing data representative of an electrogram, the instructions comprising:
one or more instructions for calculating a set of two or more intervals based
on at least a portion of the data;

one or more instructions for calculating a minimum interval based on the set of intervals;
one or more instructions for calculating a range statistic based on a difference between a first subset and second subset of the intervals;
one or more instructions for calculating a dispersion index based on a subset of the intervals;
one or more instructions for calculating a number based on the minimum interval, the range statistic, the dispersion index.